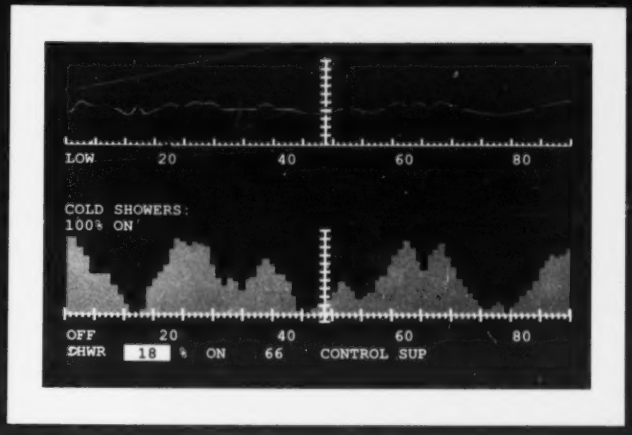
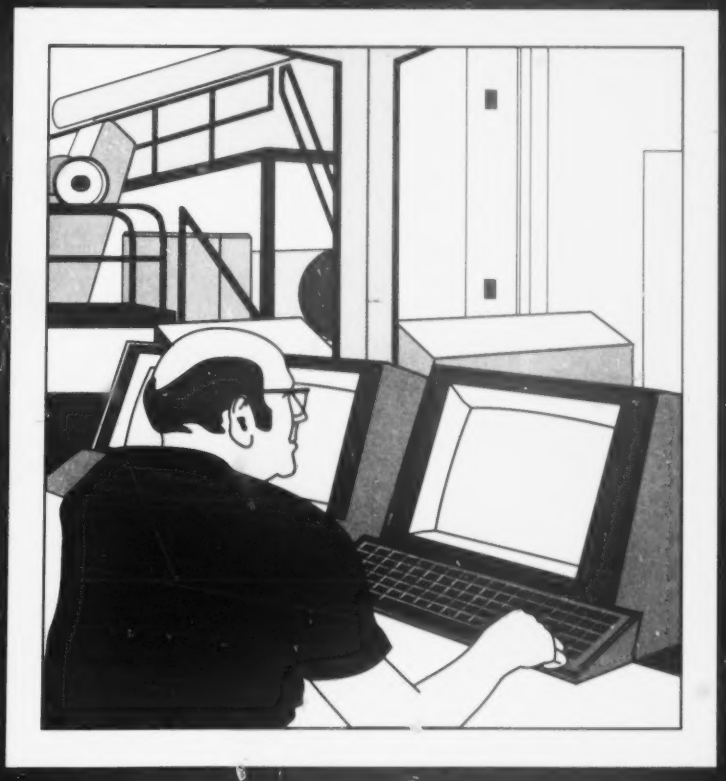
C3975-2

PULP & PAPER

February 1990





Southeast Paper's new paper machine and control system • 79, 84

Continuous digester control technology • 60

Exhibit showcase • 95

BETHESDA MD 20814
4520 EAST WEST HWY
CONGRESSIONAL INFORMATION SERVICE INC/SRI
07002397398 STG
*********3-DIGIT 208

Volume 64
Number 2

FEBRUARY

FOCUS: PROCESS AUTOMATION

Digester control 60
Southeastern linerboard mill improves quality and production by installing modified predictor and adaptive dead-time compensated controller on its continuous digester

Southeast Paper expansion 84
Recycled mill installs vendor's largest distributed control system, reducing number of systems maintained and enhancing control flexibility

Integrated control system 147
GPIC Caldwells mill in Scotland is first in Europe to install an integrated control system combining product, process, and motor controls

Integrated batch control 150
Mead Imaging uses batch controls on its special coating process to make color copier paper affording inexpensive, high-resolution copying

Reliability testing 165
Corrosion of delicate electrical/electronic equipment in paper mills can be most accurately predicted by using silver and gold plated coupons as well as copper coupons

Online sheet analysis 182
French specialty paper mill uses a camera-based system to detect and mark holes and spots in paper web and reduce customer rejects

THE COVER

This issue's focus on process automation examines recent DCS installations at U.S. and European paper mills and analyzes latest digester and coating control strategies being implemented in the North American industry. **(Cover art by Rick Eberly.)**

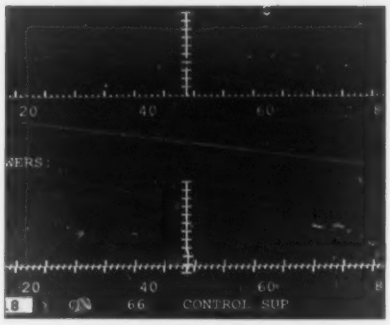


EXHIBIT GUIDE '90

Industry exhibit guide 95
Special section gives details of major exhibitors' booth displays at TAPPI '90 at the World Congress Center in Atlanta, Ga., March 5-8

FEATURES

PAPERMAKING

Groundwood fillers 65
Use of kaolin as a filler pigment for groundwood paper has increased rapidly in recent years with customer demands for higher quality

EXPANSION/MODERNIZATION

Southeast Paper mill 79
Southeast Paper Manufacturing in Dublin, Ga., doubles 100% recycled newsprint capacity with new pulp line, paper machine, boiler

ENGINEERING/MAINTENANCE

Starch buildup problem 89
Flambeau Paper uses Teflon roll covers to reduce starch buildup on dryers, producing a better sheet and reducing machine downtime

Flexible couplings 175
Replacement of old, enclosed gear couplings with new flexible units eliminates backlash, cuts downtime at Consolidated Papers mill

ENVIRONMENTAL CONTROL

Activated sludge treatment 158
Properly designed activated sludge treatment systems gained popularity in recent years, with one benefit being reduced real estate requirements

FINISHING/CONVERTING

Waterjet slitter 170
Stone Container mill uses waterjet slitter to improve winder efficiency; production advantages expand export potential and reduce downtime

MANAGEMENT

Capacity expansions 176
U.S. pulp and paper companies will add 8.6 million short tpy of manufacturing capacity by 1992, exceeding demand growth

Financing special projects 184
A specialized project financing loan can aid pulp and paper companies in financing joint venture mills, while limiting monetary risks

PULP&PAPER

FEBRUARY

EDITORIAL STAFF

ATLANTA

Editor in Chief Ken L. Patrick
Technical Editor Jim Young
Projects Editor Kelly H. Ferguson

SAN FRANCISCO

Technical Editor Timothy A. Downs
Departments Editor Virginia C. Stefan

CHICAGO

Technical Editor Andy Harrison

BRUSSELS

International Editors Peter Sutton
john Pearson
Hugh O'Brian

NEWS STAFF

SAN FRANCISCO

Executive News Editor Willard E. Mies
Senior News Editor Debra A. Garcia
News Editor Carl P. Espe
News Editor Rob Galin
News Editor Regina McGrath

NEW YORK

News Editor Noel DeKing

PRODUCTION STAFF

SAN FRANCISCO

Managing Editor Margaret L. Brown
Art Director Nancy E. Bentley
Copy/Production Editor Mary A. Corbett
Copy/Production Editor Lowell B. Denny III

Atlanta: 2000 Powers Ferry Center, Suite 450 Marietta, Ga. 30067; (404) 952-1303; Fax (404) 933-0666
Chicago: 35 E. Wacker Drive, Chicago, Ill. 60601; (312) 372-6236; Fax (312) 372-3864
San Francisco: 500 Howard Street, San Francisco, Calif. 94105; (415) 397-1881; Telex 278273; Fax (415) 543-0256
New York: 370 Lexington Avenue, New York, N.Y. 10017; (212) 683-9294; Telex 220442; Fax (212) 725-0915
Brussels: Chaussée de Charleroi 123a, Boite 5, B-1060, Brussels, Belgium

PUBLISHING HEADQUARTERS

SAN FRANCISCO

Publishing Director Leigh M. Freeman
Group Publisher Leonard E. Haas
Director of Production Andrew A. Mickus
Director of Circulation Jerry M. Okabe
Ad Production Coordinator Gary A. Fong
Marketing Manager Paula J. Irons
Marketing Assistant Robin M. Connery
Editorial Secretary Logan B. Mumaw

Sales and business offices are listed on Advertisers' Index page

MILLER FREEMAN publications
A MEMBER OF THE UNITED NEWSPAPERS GROUP

Chairman of the Board ..... Clifford D. Jakes
President ..... Marshall W. Freeman
Senior Vice President ..... Charles C. Baake
Senior Vice President ..... Leonard E. Haas
Senior Vice President ..... Thomas L. Kemp
Senior Vice President ..... Wini D. Ragus
Vice President ..... Charles H. Benz
Vice President ..... Leigh M. Freeman
Vice President ..... Andrew A. Mickus
Vice President ..... Donald A. Pazour
Chief Financial Officer ..... Stephen A. Daniels
Treasurer ..... Miller Freeman III
Assistant Treasurer ..... Douglas M. Denny

COLUMNS

From the Editors 7
by Debra A. Garcia
Recycling: legislation out?

Recycling Update 41
by Andy Harrison
Newsprint performance and quality

Career Development 43
by Roberta Bhasin
Breaking in a new boss

Maintenance Management 45
by Christer Idhammar
The right maintenance interval

Quality Report 189
by Lars Ingman
Quality and its components

Academia 221
by Ken Patrick
Paper school foundations

Comment 248
by Arthur Veverka
Outlook for market pulp

DEPARTMENTS

Conference Calendar 47
News of People 192
New Products 203
Product Review 213
New Faces in *Pulp & Paper* 201
Literature 215
Bookshelf 219
Supplier News 223

SERVICES

Reader Service Review 198
Reader Service Card 199
Professional Service Directory 226
Classified Advertising 228
Advertisers Index 246

NEWS

Month in Statistics 9
U.S. paper and paperboard production data for November

Market Report 11
European producers lower pulp prices
Stone to increase linerboard price
Uncoated free-sheet prices vary

Grade Profile 13
Tissue: New recycled tissue capacity will ease strong demand

NEWS SCAN

Smurfit, WMI join forces 23
Canadian Pacific slates lines 23
Abitibi to install deinking plant 25
Alberta Energy, MoDo plan mill 27
WTD sticks to its guns 27
Tembec machine to start up 27
Maine seeks to block G-P bid 27
Longview wants to reincorporate 29
Champion attracts major investor 29
Mallette to buy St-Raymond mill 29
Weyco studies new liner machine 29
Morris Paperboard mill sold 31
Mills lose NTT paper orders 31
Mi Ho project firms up financing 31
Ponderosa Fibres buys mill 32
Atlantic starts up machine 33
Scott Paper has a record year 33
Mosinee hits snag in P&G mill bid 35
Boise Cascade receives OSHA fine 35
Blandin union settles on fifth vote 37
Canadian effluent laws stricter 37
Dioxin debate heats up 37

International News 39
James River makes pan-European firm
Jefferson Smurfit buys board maker
Newsprint mill slated for Spain
Hyundai signs logging pact
Finnish pulp makers join forces
Scandinavian market pulp output flat

PULP & PAPER (ISSN 0033-4081), with which is combined *Paper Mill News*, *Paper Trade Journal* and *Pacific Pulp & Paper*, is published monthly except November when semimonthly by MILLER FREEMAN PUBLICATIONS, 500 Howard St., San Francisco, Calif. 94105. Second class postage paid at San Francisco and at additional mailing office. POSTMASTER: Please send addresses changes to PULP & PAPER, 500 Howard St., San Francisco, Calif. 94105.

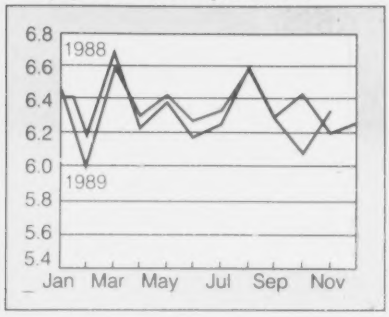
© Copyright 1990 by Miller Freeman Publications Inc. All rights reserved.

Subscriptions & Address Change: Sent without charge in the U.S.A. & Canada (upon written request) to individuals in pulp, paper, and board manufacturing firms and paper converting firms. To all others there is a subscription charge of $75.00 a year in the U.S. All subscriptions to other countries: US$95.00 a year, except Europe and Mediterranean, US$110.00 (air service included). Single copy, US$7.00, except Buyers Guide, US$35.00. 16mm microfilm, 35mm microfilm, 105mm microfiche, and article and issue photocopies are available from University Microfilms International, 300 N. Zeeb Rd., Ann Arbor, Mich. 48016; (313) 761-4700. Requests, subscription orders, and address changes must show name and position or job of individual, the name and location of mill, plant or office where employed, and the exact business or product produced at this location. **Send subscription correspondence to:** Circulation Department, PULP & PAPER, 500 Howard St., San Francisco, Calif. 94105, or call Subscriber Service at 415-267-7645. For address change, include label from recent issue.

ABP

VBPA

U.S. paper and board production



U.S. production of paper and paperboard totaled 6.4 million tons in November 1989, an increase of 2.4% over the previous year, according to the American Paper Institute. After seasonal adjustments, the trend rate for total paper and paperboard stood at 76.7 million tpy, up 0.3% from 1988. Strength was concentrated in the paperboard grades, where the seasonally adjusted trend rate was up 0.9% from the previous year to 38.5 million tpy. The paper grades were down 0.2% to 38.2 million tpy.

Among major grades, uncoated groundwood continued as the main source of strength in the paper sector. Overall, production of printing and writing grades was down 1.1% through November. Containerboard production for the domestic market was up 1.1% through November, almost matching the gains in fiber box shipments. Boxboard production for domestic use were up 0.8% through the first eleven months.

Canadian newsprint shipments totaled 816,000 metric tons in November, down 3.4% from the same month in 1988, according to the Canadian Pulp & Paper Assn. Woodpulp shipments dropped 10.9% for the month, bringing the year-to-date decline to 4.1%. ■

	Latest month (000 short tons)		% change from year ago	Annualized year-to-date (000 short tons)	% change from year ago
PAPER & PAPERBOARD PRODUCTION[1]					
Newsprint	Nov.	516	4.7	6,061	1.6
Uncoated groundwood (s)	Nov.	152	16.9	1,778	8.9
Coated paper (s)	Nov.	615	1.5	7,209	-2.6
Uncoated free-sheet (s)	Nov.	942	2.2	11,118	-1.5
Other printing/writing	Nov.	117	-10.7	1,515	-1.1
Total packaging and other paper (s)	Nov.	435	-0.9	4,943	-2.2
Tissue	Nov.	474	6.5	5,647	3.0
Total paper	**Nov.**	**3,250**	**2.7**	**38,270**	**-0.2**
Unbleached kraft paperboard	Nov.	1,585	5.0	19,567	1.7
Semichemical medium	Nov.	447	-5.9	5,669	0.3
Bleached paperboard	Nov.	374	4.5	4,538	0.7
Recycled paperboard	Nov.	715	0.0	8,682	-2.0
Total paperboard	**Nov.**	**3,121**	**2.1**	**38,456**	**0.9**
Total U.S. paper and paperboard output	**Nov.**	**6,370**	**2.4**	**76,725**	**0.3**
PULP, WASTEPAPER & FIBER[2]					
Total U.S. woodpulp production	Oct.	5,295	4.3	62,440	2.2
Market pulp production	Oct.	682	5.6	8,790	3.3
Wastepaper consumption at paper/board mills	Oct.	1,678	5.1	19,154	1.3
Pulpwood consumption (cords)	Oct.	8,331	5.3	98,890	3.8
CONVERTED PRODUCTS STATISTICS[3]					
Corrugated box shipments (billion ft²)	Nov.	25.183	0.5	289.052[6]	1.4
Containerboard inventories at U.S. box plants and mills	Nov. 1	2,451	-2.7		
INTERNATIONAL TRADE[2]					
U.S. paper imports (including products)	Oct.	1,168	11.9	12,966	0.9
Imports of Canadian newsprint	Oct.	717	5.4	8,058[6]	n.a.
U.S. paper exports (including products)	Oct.	369	-13.4	6,333	14.0
Exports of unbleached kraft linerboard	Oct.	199	39.2	2,235	4.2
Exports of woodpulp	Oct.	502	19.2	6,360	16.8
Norscan pulp inventories[4]	Nov. 30	1,175	40.6		
Norscan pulp operating rates[4]	Nov.	93%	92%	93%	97%
CANADIAN STATISTICS[5] *(reported in metric tons)*					
Total newsprint shipments	Nov.	816	-3.4	8,849[6]	-1.5
Operating rates	Nov.	95%	98%	95%	99%
Inventories held by U.S. consumers	Nov. 30	1,195	-17.4		
Other paper/board shipments	Nov.	576	3.6	6,251	2.0
Woodpulp shipments (export only)	Nov.	586	-10.9	7,084	-4.1
Operating rates	Nov.	94%	100%	98%	98%

1. American Paper Institute. 2. API, Bureau of Census, American Pulpwood Assn. 3. Fibre Box Assn., Paperboard Packaging Council. 4. North American/Scandinavian paper-grade market pulp. 5. Canadian Pulp & Paper Assn. 6. Not annualized. (s) = Shipments.

Tissue: New recycled tissue capacity will ease strong demand

Grade structure: Tissue falls into two major groups: sanitary and "other." About 98% of total output is sanitary, including bathroom, facial, toweling, napkins, basestock for sanitary stock, wadding, and wipes. The "other" group includes basestock for waxing, wrapping, and miscellaneous.

The two major markets for tissue are consumer and commercial and industrial (C&I). Consumer tissue is purchased by people at grocery stores, while industrial tissue is bought by hotels, offices, restaurants, schools, hospitals, prisons, and factories. About 38% of U.S. tissue production is C&I, while the larger portion is sold on the consumer market. Typical basis weights for tissue include 12 to 14 lb/3,000 ft² for single-ply bathroom tissue and 32 to 39 lb/3,000 ft² for single-ply towel.

Production/capacity: Two recycled tissue machines started up in second-half 1989: the third machine at Fort Howard Corp.'s Savannah River mill in Rincon, Ga., and FSC Paper Co.'s 70,000-tpy machine in Alsip, Ill. Atlantic Packaging Products Ltd.'s new 43,000-short-tpy recycled tissue machine in Whitby, Ont., was expected to start up in January. Irving Paper Co. started up a 75,000-tpy tissue machine based on virgin kraft pulp late last year. Three more machines are slated to start up later in 1990.

Last fall Fort Howard said it will add three new machines over the next five years. Scott Paper Co. has announced it will add capacity in North America and is evaluating various mill sites.

Outlook: In January 1989, Procter & Gamble Paper Products Co. led a 9.8% price hike on bathroom tissue sold east of the Rocky Mountains and an 8.0% increase in markets west of the Rockies (P&G is the market leader in consumer bathroom tissue). An increase of such size is unlikely to occur early this year because the economy is slowing down. Also, tissue mills no longer can cite rising pulp prices as an excuse for raising prices since pulp prices have leveled off.

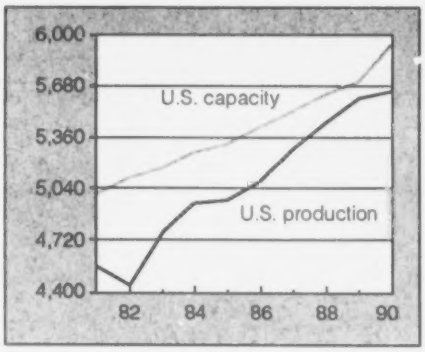
One has to take announcements of price increases in the consumer tissue market with a large grain of salt. Discounting to maintain market share often erodes price increases, and hikes are often postponed for as much as six months after an announcement. For example, last July Scott said it lost some market share in the premium branded market because its competitors lagged in implementing the hike announced in January. Producers can also manipulate sheet counts to give themselves de facto price increases. Generally, producers are lucky if they can implement half the amount of the announced increase in such a competitive market.

In a slower economy, consumers are likely to trade down to lower-priced tissue, which will hurt the large consumer tissue producers—P&G, Scott, and James River Corp. They will also be more inclined to buy private-label tissue products. Private-label napkins currently outsell all the national brands. People are likely to eat out less often, which will curtail demand for C&I tissue.

In October 1989, Fort Howard announced it was increasing the price of its towels, toilet paper, napkins, and facial tissue sold on the C&I market by 5% to 7%. Fort Howard is the market leader in the C&I sector, with about 31% market share. The company is said to be running its mills at capacity and, to avoid long lead times on orders, it decided to raise prices. Traditionally, C&I producers have slated two price increases a year, one in the spring and one in the fall. Most merchants feel a price hike this spring is likely since the increase announced last fall was accepted.

Prices: Because of the highly competitive market for consumer tissue paper, the price of tissue paper per ton is available only from the producers. Price trends tracked by the Bureau of Labor Statistics' Producer Price Index (PPI) show relative changes in price levels. Note that this is an index and not a dollar/ton price. The PPI for converted sanitary paper products, including unconverted stock (1982=100): 1980, 91.9; 1981, 98.2; 1982, 100; 1983, 102.1; 1984, 103.4; 1985, 106.6; 1986, 108.1; 1987, 109.1; 1988, 115.0; 1989 (November), 132.9.

SUPPLY/DEMAND (000 tons)



FORECAST (000 tons)

U.S.	1988	1989e	1990e
Production	5,476	5,643	5,652
Capacity[1]	5,667	5,762	5,972
Utilization	96.6	97.9	94.6
Imports[2]	60	118	114
Exports[2]	41	22	25
Apparent U.S. consumption	5,495	5,739	5,741
lb/capita	44.6	46.1	45.9
GNP ratio	2.73	2.78	2.75

e = Estimate.
1. American Paper Institute data.
2. U.S. Dept. of Commerce data.

TOP U.S. PRODUCERS (000 tpy)

	Annual capacity	Market share (%)
1. Stone Container	2,750	14.3%
2. International Paper	1,850	9.6
3. Weyerhaeuser	1,530	7.9
4. Jefferson Smurfit/CCA	1,450	7.5
5. Georgia-Pacific	1,375	7.1
6. Union Camp	1,350	7.0
7. GN Nekoosa	1,250	6.4
8. Temple-Inland	1,235	6.4
9. Packaging Corp.	800	4.2
10. Willamette	800	4.2

Market share of top five companies:
46.6%

Market share of top ten companies:
74.9%

Total U.S. capacity (1989):
19.195 million short tons

1. Includes all of Stone Container's 49% owned Seminole kraft mill in Jacksonville, Fla., Canadian capacity.
2. Excludes Inland's 205,000-tpy recycled liner mill in Ontario, Calif.

TISSUE

Ponderosa Fibres buys mill in Wisconsin

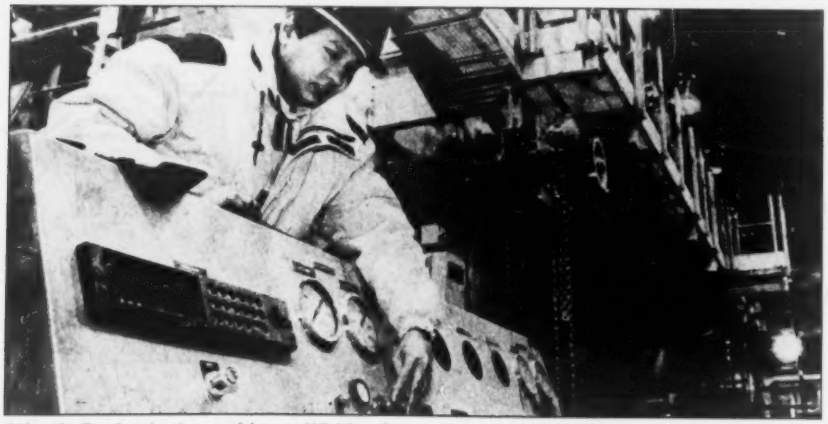
The principals of Ponderosa Fibres of America Inc., the world's largest secondary fiber market pulp producer, have purchased the former Tomahawk Tissue Corp. mill in Tomahawk, Wis. The mill, which has been idle for about one year, was scheduled to be restarted Mar. 1 under the name Tissue Recycling Co. Inc. The mill has one tissue machine that trims 82 in. When Ponderosa restarts it, the machine will make 100% recycled lightweight tissue. The deinked pulp to supply the machine will be purchased from Ponderosa Pulp Products in Oshkosh, Wis., which is believed to have capacity for about 175 tpd of bleached deinked market pulp. Tissue Recycling will also be capable of producing a lightweight tissue sheet made from 100% postconsumer wastepaper.

The tissue will be sold in parent roll form to converters serving the consumer and the commercial and industrial tissue markets. A spokesman for Ponderosa said it is possible that Tissue Recycling may eventually convert some tissue onsite. A spate of tissue machines using secondary fiber are sprouting up in the Midwest: FSC Paper Co., Alsip, Ill.; Wisconsin Tissue Mills, Menasha, Wis.; James River Corp., Green Bay, Wis., has a new deinking line; and Mosinee Paper Corp. plans to add a deinking line to Procter & Gamble Co.'s Cheboygan, Mich., mill if it decides to purchase it. In addition, Fort Howard Corp. announced last summer that it would seek permits to expand its tissue mill in Green Bay, Wis.

The spokesman for Ponderosa Fibres said he did not feel that obtaining the wastepaper for the Tomahawk mill would be a problem, as Ponderosa has been in business since the mid-1960s and has access to all the paperstock it needs. Ponderosa Fibres used to own Ponderosa Paper in Flagstaff, Ariz., which also made tissue. It later sold this mill, which is now owned by Orchids Paper Products Inc. ■

Atlantic starts up recycled tissue machine

Atlantic Packaging Products Ltd. of Whitby, Ont., said it planned to begin making recycled tissue on its new machine before the end of January. Once in full production, the new mill will make about 27,200 metric tpy of tissue and will consume about 34,000 tpy of wastepaper, including such grades as white ledger, coated book stock, and computer printout paper. The new machine will double the mill's paper capacity. Atlantic manufactures consumer tissue products from recycled paper under its own brands, such as Atlantic, April Soft, and Fiesta. It also supplies private label tissue to retailers in Canada. Harry Shelson, Atlantic vice president, said, "We have no doubt there is a consumer market for recycled paper products; we have just begun to scratch the surface." Atlantic said it plans to start up a recycled newsprint mill next to the tissue mill in 1991. ■



Atlantic Packaging's machine at Whitby, Ont., will consume 34,000 tons of wastepaper.

Scott Paper chalks up another record year

Scott Paper Co. said it expects 1989 to be its sixth consecutive year of record operating earnings but cautioned that earnings will not be as high as Wall Street had envisioned earlier last year. In an interview with the *Wall Street Journal*, Scott chairman and CEO Philip E. Lippincott said much of the blame for the lower than expected results was due to problems at some of S.D. Warren Co.'s mills, which in 1988 made up about 27% of Scott's total sales.

He said that the rebuilt coated paper machine at Muskegon, Mich., "has not run worth a damn" since it was restarted last summer. Because demand for S.D. Warren's output remains high and some categories are on allocation, these mechanical problems have hurt sales. The machine in question is No. 5. A $100-million rebuild of No. 5 was announced about a year ago, and it is expected to lift mill capacity by about 30% when completed in second-half 1990. The rebuild is being done in two phases, and the first phase was completed last summer. More rebuild work will be done on the machine in summer 1990. Lippincott said Scott plans some management changes at Muskegon and hopes to get the machine running better by the end of next summer. Scott has already rebuilt No. 4 machine at the mill at a cost of about $60 million. Both machines make heavyweight coated paper, such as that used in annual reports. The mill's capacity is estimated to be 400 tpd.

Lippincott said that earnings from its U.S. tissue business are 15% above 1988's, and both the Canadian and Taiwanese operations are performing better than expected. In Europe, however, earnings are down 20% to 30%. This is due partly to the fact that a new technique for producing bathroom tissue in France met aggressive competition. Profits are also lower in the U.K. Lippincott said consumer demand for recycled and chlorine-free products caused it to lose 1% of its market share in the U.K. He said the first order of business in the new year will be to cut the U.K. work force by 200 to 300 people, even if this causes a strike. He said the division has to become more competitive before 1992, when the European Community will unite economically.

This year he expects the company

PAPER/BOARD CAPACITY EXPANSIONS WILL EXCEED DEMAND GROWTH BY 1992

U.S. paper companies will spend $15 billion on capital outlays in '90-'92 and are focusing expectations on long-term domestic and worldwide demand growth

By NOEL DEKING, News Editor

Pulp and paper companies in the U.S. will add 8.6 million short tons of manufacturing capacity over the next three years, leading to a 3.4% average annual gain, according to the American Paper Institute's 1989 annual capacity survey. The 1989 survey continues the strong expansion trend reported in last year's survey, but this raises concern because demand for the industry's output is slowing. The industry will spend a record $15 billion annually on capital outlays in the next three years, adding capacity faster than demand is likely to grow. Nine new paper and paperboard machines were brought into production in 1989, and at least 23 additional machines are scheduled to come onstream over the next three years.

New paper and paperboard machine installations in existing mills will comprise the largest single component of growth and will represent 3.8 million tons, or 44.5% of all new capacity. New machine installations in greenfield mills will represent 1.2 million tons, or 14.3% of the total. Machine rebuilds and other miscellaneous improvements will represent the remaining 3.6 million tons, or 41.2% of the net capacity gain. The projected growth in paper and paperboard capacity will raise the U.S. industry's potential annual production to over 91 million tons by 1992, up from 88.4 million tons in 1989.

Consumption of woodpulp, wastepaper, and other fibrous materials as furnish for papermaking will increase at a 3.6% annual growth rate in the next three years, reaching 91.9 million tons by 1992. Woodpulp will continue to be the industry's primary fiber source, but wastepaper utilization is projected to grow at nearly twice the rate of virgin fiber use. This acceleration of wastepaper use exceeds the levels of use projected by producers in last year's survey. Higher levels of wastepaper consumption will be aided by the introduction of major recycling projects throughout the U.S.

Expanded use of wastepaper as a fiber source will occur even as U.S. papermakers continue to add 5.6 million tons of new woodpulp capacity in the next three years, raising the industry's total woodpulp capacity from 64.3 million tons in 1989 to 69.9 million tons in 1992. Woodpulp capacity will increase at an annual 2.8% rate, which is slightly less than the 3.4% annual rate projected for paper and paperboard. The differential between woodpulp supply and paper and paperboard production will be made up by the increased use of wastepaper as a fiber source.

PULP BOOM TO CONTINUE. A total of 4.7 million tons of new pulp capacity will be added in the chemical grade pulps, where sulfate and soda pulps dominate. About 70% of the increase will be in the bleached grades, which are used in printing and writing paper and food packaging, and 30% of the increase will be in unbleached grades, which find uses in containerboard and other packaging. The chemical grade pulps will account for 84% of all new woodpulp capacity additions through 1992, but capacities for sulfite pulp and dissolving and special alpha pulp are not expected to change.

Mechanical pulp grades have grown at a faster rate than chemical grades of woodpulp in recent years, owing to the successful introduction of thermomechanical pulp (TMP) and chemi-thermomechanical pulp (CTMP). These mechanical pulps usually replace or reduce the chemical pulp component in newsprint or groundwood paper. Mechanical pulp capacity is expected to increase by 794,000 tons in the next three years, and by 1992 TMP and CTMP capacity will total 3.8 million tons, or 51.2% of all mechanical grades.

Significant increases in market pulp capacity are also planned in the next three years, spurred by worldwide demand and high prices for bleached pulp. Market pulp capacity is expected to increase at a 4.5% annual rate, growing from 9.1 million tons in 1989 to 10.4 million tons in 1992. Mills producing market pulp for sale in the open market will represent 15% of all U.S. woodpulp capacity by 1992. Companies planning new market pulp mill expansions include Weyerhaeuser Co., Columbus, Miss.; Stone Savannah River Pulp & Paper Corp., Port Wentworth, Ga.; Bowater Southern Corp., Calhoun, Tenn.; Alabama River Pulp Co., Claiborne, Ala.; and Pope & Talbot Inc., Halsey, Ore.

WASTEPAPER TAKES OFF. Consumption of wastepaper in the manufacture of paper and paperboard will increase from an estimated 20.9 million tons in 1989 to nearly 25 million tons by 1992. The growth rate for wastepaper consumption will average 6.2% annually during the next three years, nearly twice as fast as the growth of virgin fiber sources. The percentage of wastepaper used by the industry will increase from 25.4% of fiber supply in 1989 to 27.2% in 1992. At the same time, primary and secondary woodpulp sources will drop from 74.6% of fiber supply in 1989 to 72.8% in 1992.

More than a dozen states have already implemented laws urging manufacturers to use more recycled fiber. This situation has led to a boom in secondary fiber expansion projects and proposals, as papermakers scramble to position themselves to comply with the new recycling mandate. Most wastepaper has traditionally been consumed at paperboard mills, but expansions in recycled tissue and newsprint have accelerated. More than 60 wastepaper processing projects, including several greenfield mills, are planned in the U.S. and Canada, a 50% increase over last year.

NEWSPRINT OVERSUPPLY? U.S. newsprint capacity growth will lead all other paper and paperboard grades in the next three years. Newsprint capacity will increase from 6.3 million tons in 1989 to 7.3 million tons in 1992, a 5.1% annual growth rate. This growth is paced by the addition of three new paper machines that came onstream this year plus two additional machines planned for 1990 and 1991. Companies starting up new machines this year include Southeast Paper Manufacturing Co., Ponderay Newsprint Co., and Newsprint South Inc. Alabama River Newsprint Co. will start up a new machine in 1990, and North Pacific Paper Corp., a joint venture of Weyerhaeuser and Jujo Paper Co. Ltd., will start up a new machine in 1991.

While virgin newsprint is likely to suffer from overcapacity in the next three years, there is a scramble to produce recycled newsprint containing between 25% and 50% secondary fiber content. The new Southeast Paper newsprint project and the North Pacific project will each have a deinking facility capable of supplying processed wastepaper to the newsprint machine. Additionally, Smurfit Newsprint Corp. and Garden State Paper Co. are studying locations in the Northeast for construction of new greenfield recycled newsprint mills.

Separately, the Canadian Pulp & Paper Assn.'s 1989 capacity survey projects an increase of 1.6 million tons of newsprint capacity in Canadian mills by 1991. This represents an annual growth rate of 4.7% to 12.7 million tons by 1991. Canada will add six new newsprint machines during 1989-91.

PRINTING/WRITING DELAYS SOME PROJECTS. Capacity for printing and writing paper is projected to increase at a 3.6% annual rate in the next three years, slightly below the 3.9% growth rate projected in last year's survey. Seven new paper machines, four dedicated to uncoated free-sheet and three to coated free-sheet grades, are now under construction and scheduled to be brought into production in 1990 and 1991. Between 1990-92, capacity for uncoated free-sheet will increase at a 3.5% annual rate, or a total of 1.3 million tons. Coated free-sheet will increase at an 8.8% annual rate, or a total of 1.1 million tons. Coated groundwood will increase at only a 1.5% annual rate, and uncoated groundwood will increase at a 1.1% annual rate.

The current weakness in coated paper markets has caused the recent postponement of two new coated groundwood paper machines planned by Blandin Paper Co. and Bowater Inc. Fraser Inc. has also indefinitely postponed a new lightweight coated (LWC) paper machine planned for either of the company's mills in New Brunswick or Maine. In contrast to the coated groundwood grades, capacity expansions for coated free-sheet are on schedule, including installation of the first paper machine at Champion International Corp.'s Quinnesec, Mich., bleached kraft pulp mill.

The uncoated paper market has also witnessed some

TABLE 1: **Growth trends in U.S. capacity (000 short tons).**

	Additions 1980–89		Additions 1990–92	
	Ten-year increase	Average annual growth	Three-year increase	Average annual growth
Total all grades paper and paperboard	**15,550**	**2.1%**	**8,853**	**3.3%**
Total paper	10,147	2.9	4,274	3.3
Newsprint	2,081	4.1	1,001	5.1
Printing/writing	7,754	4.0	2,649	3.6
Tissue	892	1.7	441	2.5
Packaging and industrial converting	(581)	(1.0)	185	1.1
Total paperboard	7,683	2.1	4,357	3.4
Unbleached kraft	5,321	3.0	2,382	3.7
Solid bleached	455	1.0	479	3.3
Semichemical	1,053	2.0	303	1.7
Recycled	855	0.9	1,193	4.0
Construction grades	(2,280)	(7.0)	21	0.3
Total all grades woodpulp	**11,443**	**2.0%**	**5,613**	**2.8%**
Total woodpulp[1]	12,651	2.2	5,608	2.8
Dissolving and special alpha	(56)	(0.4)	—	—
Sulfite	(385)	(2.1)	3	0.1
Sulfate and soda[2]	10,720	2.5	4,710	3.1
Semichemical	312	0.7	102	0.7
Mechanical	2,059	3.8	794	3.8
Construction paper and board	(1,208)	(8.8)	5	0.2

1. Excluding pulp for construction paper and board.
2. Includes screenings.
( ) = Decline.
Source: American Paper Institute.

project delays. Boise Cascade Corp. has delayed the startup of a new uncoated free-sheet paper machine at International Falls, Minn., from 1990 to 1991, and several unidentified companies have postponed new uncoated free-sheet capacity planned for 1990-91.

Lake Superior Paper Industries Inc. has delayed a decision to add a new supercalendered (SC) groundwood paper machine in Minnesota, and Daishowa America Co. has postponed plans to install a new groundwood directory paper machine at its Port Angeles, Wash., mill.

FOUR NEW TISSUE MACHINES. Four new tissue paper machines, including two in greenfield mills being constructed by Kimberly-Clark Corp., will add 441,000 annual tons of new capacity by 1992. Industry capacity will increase from 5.8 million tons in 1989 to 6.2 million tons in 1992. These new capacity additions include facilities for the production of both household and industrial tissue grades, and 80% of the new capacity will be based on wastepaper as a fiber source.

PACKAGING AND INDUSTRIAL. The long-term decline in kraft and specialty packaging and industrial paper bottomed out in 1989, and capacity is projected to increase at a 1.1% annual rate in the next three years. These additions will raise capacity from about 5.4 million tons in 1989 to 5.6 million tons in 1992. Longview Fibre Co. and Consolidated Papers Inc. are both installing new paper machines that will produce a variety of lightweight specialty packaging grades. API recently reclassified 275,000 tons of unbleached kraft paper capacity and 75,000 tons of bleached kraft paper capacity from the commodity kraft grades to specialty grades.

FOUR NEW LINERBOARD MACHINES. Producers of unbleached kraft paperboard will add 2.4 million tons of new capacity in the next three years, which represents a 3.7% annual growth rate. This rate of capacity growth is slightly lower than last year's estimate because producers have lowered their kraft linerboard estimate for 1991 by about 200,000 tons. Nevertheless, kraft linerboard, the major product in this category, will add 2.1 million tons during 1990-92, raising industry capacity to an estimated 21.3 million tons by 1992.

Four new kraft paperboard machines will supply 48% of the total increase in capacity, and machine rebuilds, installations of high-pressure presses, and other machine improvements will provide 52% of the total increase. Gaylord Container Corp., Union Camp Corp., and probably Weyerhaeuser (the latter must still be approved) will install new kraft linerboard machines in the next three years, but some of this new capacity will replace existing capacity that will be permanently shut down. Mead Corp. will start up a new kraft paperboard machine at the end of 1990 that will be capable of producing both coated folding carton grades and lightweight linerboard.

Recycled linerboard capacity is expected to more than double from 455,000 annual tons in 1989 to 1.2 million tons in 1992. New greenfield recycled linerboard projects are planned by Daishowa and Kenaf of North America Inc. Additional recycled containerboard projects now under study should augment this trend.

TABLE 2: **U.S. paper/board annual capacity, 1989-92 (practical maximum basis, 000 short tons).**

Grades	1989	1990	1991	1992[1]
Total all grades	**84,583**	**87,148**	**90,340**	**93,236**
Total paper and paperboard	**82,444**	**85,001**	**88,182**	**91,077**
Total paper	**41,326**	**42,649**	**44,342**	**45,600**
Newsprint	6,280	6,806	7,123	7,281
Printing/writing	23,811	24,393	25,492	26,460
Uncoated groundwood	1,846	1,808	1,877	1,905
Coated groundwood	4,467	4,607	4,621	4,658
Coated free-sheet	3,675	3,892	4,282	4,735
Uncoated free-sheet	12,149	12,403	13,022	13,463
Cotton fiber	205	210	212	212
Thin paper	287	288	288	289
Solid bleached bristols	1,183	1,185	1,188	1,188
Packaging and industrial converting	5,472	5,475	5,600	5,657
Unbleached kraft	2,854	2,871	2,889	2,905
Bleached packaging and industrial converting	466	429	442	442
Specialty packaging	657	660	709	722
Special industrial	1,495	1,515	1,559	1,587
Tissue	5,762	5,972	6,127	6,203
Total paperboard	**41,119**	**42,352**	**43,840**	**45,476**
Unbleached kraft	20,867	21,482	22,409	23,249
Kraft linerboard	19,195	19,781	20,543	21,280
Solid bleached	4,723	4,838	5,051	5,202
Semichemical	5,917	6,003	6,010	6,220
Recycled	9,612	10,029	10,370	10,805
Total construction paper, paperboard, and other	**2,139**	**2,148**	**2,159**	**2,180**

1. Capacity additions presented here for 1991 include only presently known commitments.
Source: American Paper Institute.

TABLE 3: **U.S. market woodpulp capacity, 1989-92 (practical maximum basis, 000 short tons).**

Grades	1989	1990	1991	1992[1]
Total market woodpulp	**9,091**	**9,335**	**9,742**	**10,382**
Dissolving	1,495	1,495	1,495	1,495
Chemical paper	7,592	7,826	8,226	8,859
Sulfite paper	252	252	252	252
Sulfate and soda paper	7,341	7,574	7,975	8,607
Bleached and semi-bleached softwood	4,176	4,378	4,661	5,159
Bleached and semi-bleached hardwood	2,975	3,007	3,124	3,259
Unbleached	190	190	190	190
All other	4	14	21	28

1. Capacity additions presented here for 1991 include only presently known commitments.
Source: American Paper Institute.

Semichemical corrugating medium capacity growth will be lower than kraft linerboard growth rates because of the increased use of recycled corrugating medium. Semichemical capacity will increase only 303,000 tons over the next three years, or only 1.7% yearly. In contrast, capacity for recycled corrugating medium will increase by 230,000 tons for an 11.3% annual growth rate.

SBS EXPANDS TO EASE SHORTAGES. The market shortage of solid bleached paperboard will be alleviated in the next three years as producers add 479,000 tons to the capacity base. This 3.3% annual growth rate will raise industry capacity from 4.7 million tons in 1989 to 5.2 million tons by 1992. Westvaco Corp. will install a fourth paper machine at its Covington, Va., mill, which will initially have 220,000 tons of capacity at startup in 1992, but this will ultimately expand to 350,000 tpy. This will be the first major new machine installation for the solid bleached sulfate (SBS) grades since Westvaco's last new machine in 1986. In Canada, Temboard Inc., a joint venture between Tembec Inc. and Jefferson Smurfit Corp., will start up a new 110,000-metric-tpy, three-ply LWC bleached paperboard machine in early 1990.

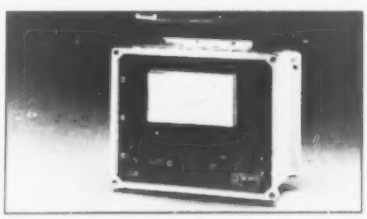
Federal Paper Board Co. will install a new LWC bleached paperboard machine at its Augusta, Ga., mill in 1992, but the machine's production will primarily be marketed as printing bristols rather than packaging grades. International Paper Co., Potlatch Corp., Temple Inland Forest Products Corp., Georgia-Pacific Corp., and Gulf States Paper Corp. have recently completed or will soon complete machine rebuilds and debottlenecking projects that will also add incremental capacity in the next few years.

Producers of recycled boxboard packaging grades have enjoyed a revival in recent years and plan to increase capacity by about 1.5% yearly in the next three years. This projected increase in capacity is nearly double the rate projected in last year's survey. Most of the incremental capacity gains will come from machine rebuilds for folding carton and chipboard grades, but U.S. Paper Mills Corp. and Newark Group will install new machines to primarily produce core stock. Capacity of recycled packaging grades, exclusive of containerboard and gypsum liner grades, will increase from an estimated 5.7 million tons in 1989 to 5.9 million tons in 1992.

Single copies of the API capacity survey are available for $325 in the U.S. and $350 overseas from the Capacity Dept., Box CMS, American Paper Institute, 260 Madison Ave., New York, N.Y. 10016. ■

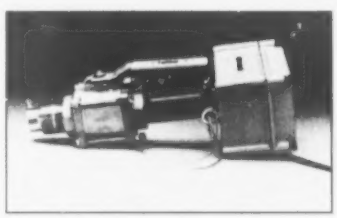
Total Suspended Solids Monitor, Sensors—And Support

Monitor



Model 7010 Total Suspended Solids Monitor
- Scaling ranges unlimited between 0 to 80,000 mg/l
- Reliable, proven electronics

Sensors



Pipe Insertion Sensor
- Automatic self-cleaning
- All wetted surfaces of 316 stainless steel and ground glass
- Stainless steel safety extraction harness

Submersion Sensors
- Models 74 and 77, non-self-cleaning
- Model 78, self-cleaning

And Support

- Proven Royce dependability • Quality factory support
- Simple, reliable designs that are affordable. CALL NOW!

ROYCE INSTRUMENT CORPORATION

13555 Gentilly Road • New Orleans, LA 70129
504/254-8888 • FAX: 504/254-8855

1-800-347-3505

On Reader Service Card **Circle 180**